

characteristic of which can be freely changed, transmitting a control frame from the satellite station, the master station starting to return a carrier wave, the satellite station determining such a direction of antenna directivity characteristic that a carrier wave transmitted from the master station may be received with the maximum intensity, and fixing the directivity characteristic of a satellite station antenna to the direction of the master station in a wireless LAN system mainly using a millimeter wave.

[0125] Furthermore, the wireless LAN system can automatically cope with the deterioration of a communication environment due to the movement of a data terminal or a satellite station, or the shift of the position of an antenna, and the best communication quality can be always provided by setting conditions for the number of error frames allowed to be received in a satellite station, or the receiving electric field intensity of a data frame, and determining an optimal antenna directivity characteristic again when the conditions are not met.

[0126] The power in the master station can also be saved by making the intensity of a carrier wave transmitted from the master station while determining, less than the intensity at the time of normal data communication.

[0127] Accordingly, according to the present invention a strong and flexible wireless LAN system can be constructed, and the present invention greatly contributes to the realization of a high-speed wireless LAN system using a millimeter wave in an unused wave range assigned to data communication.

What is claimed is:

1. A wireless local area network system comprising a wireless local area network master station for supporting communication between satellite stations belonging to the master station, and one or more wireless local area network satellite stations, wherein

the satellite station in the relevant local area network comprises

an antenna for dynamically changing a directivity characteristic when receiving electric waves from the master station;

control frame transmitting means for transmitting control frames prior to the commencement of communication; and

antenna directivity characteristic controlling means for determining such a directivity characteristic that the receiving electric field intensity of a carrier wave transmitted from the master station when receiving the relevant control frame may become a maximum by changing the directivity characteristic of said antenna, and

the master station in the relevant local area network system comprises carrier wave transmitting means for starting to transmit carrier waves when receiving said control frame.

2. A wireless local area network system comprising a wireless local area network master station for supporting communication between satellite stations belonging to the master station, and a plurality of wireless local area network satellite stations, wherein

the satellite station comprises antenna directivity characteristic adjusting means for adjusting the antenna directivity characteristic of a receiving antenna so that the receiving electric field intensity of electro-magnetic waves transmitted from the master station becomes a maximum, and

the master station comprises electromagnetic wave transmitting means for transmitting electromagnetic waves with such intensity as to enable a satellite station to detect at least said receiving electric field intensity while the directivity characteristic of the relevant receiving antenna is adjusted in the satellite station.

3. A transmitter-receiver for communicating with another party in a wireless local area network system provided with an antenna, the directivity characteristic of which can be dynamically changed when receiving electric waves, comprising:

control frame distinguishing means for distinguishing a control frame transmitted from said communication partner from a data frame prior to the commencement of communication; and

carrier wave transmitting means for starting to transmit a carrier wave so that said communication partner may determine such a directivity characteristic that the receiving electric field intensity of said antenna may become a maximum.

4. The transmitter-receiver according to claim 20, wherein the antenna provided for said communication partner is an active phased planar-array antenna.

5. The transmitter-receiver according to claim 20, wherein said carrier wave transmitting means makes the transmitting power of the carrier waves less than the transmitting power at the time of a normal data frame when receiving said control frame.

6. A method for optimizing communication quality in a wireless local area network system comprising a master station for supporting communication between satellite stations belonging to the master station, comprising the steps of:

enabling the relevant satellite station to perform the steps of:

transmitting a control frame to a communication partner prior to the commencement of communication; and

determining such a directivity characteristic that the receiving electric field intensity of a carrier wave transmitted from the master station in the relevant local area network may become a maximum when receiving said control frame by changing the directivity characteristic of an antenna, the directivity characteristic of which can be dynamically changed when receiving said control frame; and

enabling the master station in the relevant local area network system to perform the step of starting to transmit a carrier wave when receiving said control frame.

7. The method for optimizing communication quality in a wireless local area network system comprising a master station for supporting communication between satellite stations belonging to the master station, comprising the steps of: